

REMARKS

Reconsideration of this application as amended is respectfully requested. In this amendment, claims 15, 17, 19, and 25 have been amended. Claim 18 has been canceled. No claims have been added. No new matter has been added.

Claims 15-19, 21-22, 24-25 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S Patent No. 6,537,437 by Galambos et al., (hereinafter "Galambos"). Applicants do not admit that Galambos is prior art and reserve the right to swear behind Galambos at a later date. Furthermore, applicants respectfully submit that claim 15 is patentable over the cited reference because Galambos does not disclose all of the features of the claim.

Claim 15, as amended, recites:

15. An actuator comprising:

a tube with an open end and an inner surface being formed of a porous material having porous channels that are at least partially filled with a liquid containing an electrolyte, the inner surface being electrically chargeable when in contact with the liquid;

an electric field generator for generating a field along a lengthwise axis of the tube to induce a pressure in the liquid; and

an object in fluid communication with the liquid in the tube through the open end such that the pressure in the liquid exerts a force on the object;
wherein the force on the object is able to actuate the object.

(Emphasis added).

Galambos discloses a surface-micromachined apparatus having a microchannel formed on a substrate from a plurality of deposited and patterned layers of polysilicon and silicon nitride. (Galambos, col. 1, line 66 to col. 2, line 5). Nowhere does Galambos disclose to use a porous material to form the surface-micromachined fluidic devices. On the contrary, as shown above, Galambos specifically discloses the use of non-porous materials, such as

polysilicon and silicon nitride, for the formation of the surface-micromachined fluidic devices. In contrast, the amended claim 1 recites “a tube with an open end and an inner surface being formed of a porous material having porous channels that are at least partially filled with a liquid containing an electrolyte.” Because Galambos fails to disclose all of the features in claim 1, applicants submit that claim 1 is patentable over Galambos.

Claims 16, 17, 19, 21-22, and 24-25 directly or indirectly depend from the independent claim 15, and incorporate all of the features therein. At least for the reasons stated above with respect to claim 15, applicants respectfully submit that claims 16, 17, 19, 21-22, and 24-25 are patentable over the cited reference.

Claim 18 has been canceled; therefore, the rejection of claim 18 under 35 U.S.C. § 102(e) is now thereby moot.

Accordingly, applicants respectfully request that the rejection of claims 15-19, 21-22, and 24-25 under 35 U.S.C. § 102(e) be withdrawn.

Claims 28-33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Galambos.

Given that claims 28-33 directly or indirectly depend from the independent claim 15 which are patentable over Galambos for at least the reasons stated above, applicants respectfully submits that claims 28-33 are also patentable over the cited reference.

It is respectfully submitted that Galambos teaches away from the use of porous materials. Galambos describes, for example, at column 1, lines 52 to 55 that “an electroosmotic force can be produced to act upon a fluid without the need for a microporous dielectric medium as has been heretofore required.” (Emphasis added). Applicants, on the other hand, acknowledge that the pressure capable of being developed in a porous material can be harnessed, for example, to drive a piston.

In addition, Galambos describes at column 15, lines 10 to 13 that “[a]dditional coils or electrodes (not shown) can be formed oriented about the channel 14 to urge particular constituents to move in one or more lateral directions perpendicular to the direction of the flow of the fluid in the channel 14.” Significant ease of fabrication, however, can be realized through the use of a porous material, given that surface micro-machining is not required to create additional electrodes.

Furthermore, Galambos teaches electrodes 16 associated with each micro channel lead to complicated design and construction. Because the porous channels are situated in an electrically chargeable inner surface, only one electrode need be applied to the inner surface to generate an electroosmotic force.

As the Examiner has acknowledged, Galambos does not disclose that “the object is a piston slideably mounted in the cylinder,” as recited in claim 28. (Office Action, 06/24/2010, page 4). The Examiner, however, asserts that a deformable wall of Galambos which could be coupled to linkages and the like can be viewed as amounting to the claimed piston. Applicants respectfully disagree and submit that a deformable wall and mechanical linkages to an actuator would form a complicated machine, which can be distinguished in view of applicants’ superior approach of a simple piston that is actuated by pressure developed in connection with pores of an inner surface of a tube.

Accordingly, applicants requests that the rejection of claims 28-33 under 35 U.S.C. § 103(a) be withdrawn.


Applicants respectfully submit that in view of the amendments and arguments set forth herein, the applicable rejections have been overcome. Applicants reserve all rights under the doctrine of equivalents.

Pursuant to 37 C.F.R. 1.136(a)(3), applicants hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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